

CLAIMS:

- 8/13/11
1. A fuel cell comprising
 a vessel including
 a source of hydrogen atom;
 a catalyst having a net enthalpy of reaction of at least $m \cdot 27$ eV,
 where m is an integer; and
 a cathode,
~~whereby said hydrogen atom reacts with said catalyst and said cathode in said vessel, thereby producing a hydride ion having a binding energy greater than 0.8 eV.~~
2. A fuel cell comprising
 a vessel having
 a first compartment containing a cathode and increased binding energy hydrogen atom having a binding energy of about $13.6/n^2$ eV, where n is a fraction whose numerator is 1 and denominator is an integer greater than 1;
 a second compartment containing an anode and a reductant; and
 a salt bridge connecting the first compartment and the second compartment,
~~whereby said increased binding energy hydrogen atom reacts at said cathode with electrons supplied by said reductant, thereby producing a hydride ion having a binding energy greater than 0.8 eV.~~
3. A fuel cell of claim 1 or 2 which comprises a battery.
- 3/4. A fuel cell of claim 2 further comprising a source of increased binding energy hydrogen atom for supplying said increased binding energy hydrogen atom.
- 4/5. A fuel cell of claim 3 wherein said source of increased binding energy hydrogen atom comprises a compound including at least one increased binding energy hydrogen species selected from the group consisting of:

an increased binding energy hydride ion having a binding energy greater than 0.8 eV,

said increased binding energy hydrogen atom,

an increased binding energy hydrogen molecule having a first binding energy of about $15.5/n^2$ eV, and

an increased binding energy molecular hydrogen ion having a first binding energy of about $16.4/n^2$ eV.

⁵~~6~~. A fuel cell of claim ³~~4~~ wherein said increased binding energy atomic hydrogen is provided by at least one source cell selected from the group consisting of an electrolytic cell, a gas cell, a gas discharge cell, and a plasma torch cell, and the fuel cell further comprises a passageway for said increased binding energy hydrogen atom communicating between said source cell and the fuel cell first compartment.

~~7. A fuel cell of claim 1 or 2 further comprising a getter for said increased binding energy atomic hydrogen.~~

~~8. A fuel cell of claim 7 wherein said getter comprises a metal with a low work function.~~

~~9. A fuel cell of claim 8 wherein said metal is an alkali or an alkaline earth metal.~~

⁶~~10~~. A method for generating electricity in a vessel having a first compartment containing a cathode, a second compartment containing an anode and a reductant, and a salt bridge connecting the first compartment and the second compartment, said method comprising the steps of

supplying increased binding energy hydrogen atom having a binding energy of about $13.6/n^2$ eV, where n is a fraction whose numerator is 1 and denominator is an integer greater than 1, to said first compartment, and

reacting said increased binding energy hydrogen atom at the cathode with electrons supplied by the reductant in said first compartment, thereby producing an increased binding energy hydride ion having a binding energy greater than about 0.8 eV in said first compartment.

⁶~~7H~~. A method of claim ⁶~~10~~ wherein said step of supplying includes releasing said

SECRET 47580060

120

atomic hydrogen by thermal decomposition upon heating a compound including at least one increased binding energy hydrogen species selected from the group consisting of the increased binding energy hydride ion, the increased binding energy hydrogen atom, an increased binding energy hydrogen molecule having a first binding energy of about $15.5/n^2$ eV, and an increased binding energy molecular hydrogen ion having a first binding energy of about $16.4/n^2$ eV.

⁸₁₂. A method of claim ⁷~~11~~ wherein said step of reacting includes contacting the electrons with said compound including at least one of said increased binding energy hydrogen species.

⁹₁₃. A method of claim ⁷~~11~~ wherein said step of supplying includes reacting said compound including at least one of said increased binding energy hydrogen species with an element replacing from said compound at least one of said increased binding energy hydrogen species.

¹⁰₁₄. A method of claim ⁷~~11~~ wherein said compound is substantially pure.

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